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gather observations of cirrus within the tropics (see *Nature*, 1887-1889). These observations were followed by the systematic work of Hildebrandsson who has shown that the prevailing motion of the cirrus between 20°N. and 20°S. is from the east. Above these latitudes the prevailing cirrus motion is from the west.

It is probable that between these two regions of opposing winds there is a narrow belt of comparative calm across which the air moves very slowly from the equator. The spread of the dust from Krakatoa across this region apparently did not exceed a velocity of one mile an hour, so that it was two months or more after the eruption before sky glows were observed in high northern latitudes.

It is evident that observations on the sky glows following volcanic eruptions are very desirable for the study of the atmosphere. It is thought that some bright sunsets observed at Blue Hill last autumn may have been connected with a volcanic eruption in May in Java and subsequent brilliant sunsets in Mauritius described by Claxton. If notes were made elsewhere of unusually brilliant sunsets we should be glad to receive them at this Observatory and also accounts of such sky phenomena as may follow the eruption at Martinique.

HENRY HELM CLAYTON.

BLUE HILL OBSERVATORY,  
May 10, 1902.

#### THE WORD 'ECOLOGY.'

TO THE EDITOR OF SCIENCE: After the full discussion of the origin, history and use of the word *ecology* in SCIENCE for April 11, it is certainly surprising to read the inexcusably erroneous statements about this word by Mr. F. A. Bather in the current number of the same journal. After correctly stating the meaning of the word, Mr. Bather goes on to say: "Haeckel and biologists generally have used the word in the above sense, but of recent years the botanists have wrested, or at least restricted, the meaning of the term to the study of the associations of plants in such groups as alpine, sand-dune and desert plants; and this is the sense intended on pp. 458, 459 of SCIENCE for March 21. In a word they have

used 'ecology' instead of 'ecological plant geography.'" This statement is extremely misleading if not wholly erroneous. It is possible that some writers have so restricted the term, but I cannot recall any case of it. Mr. Bather cannot surely here refer to Cowles's use of the phrase 'physiographic ecology,' because Cowles, in his elaborate paper in which he introduces the phrase expressly defines ecology in its full scope and shows that his use of the term is by no means an attempt at a restriction of it. Botanists, universally as far as I know, use the word in very nearly if not exactly its original broad sense, as applying to all forms of adaptation of organisms to their environment, and hence it is perfectly proper to apply it to plant associations when studied from the point of view of adaptation. If it were needful I could cite columns of references to prove this usage, but I will simply refer to the fact that ecology is used in its broad sense, with no attempt at such restriction as Mr. Bather avers, in all the modern botanical text-books including Campbell's 'University Text-Book' just issued, in a recent official publication ('Report on a College Entrance Option in Botany') by the Society for Plant Morphology and Physiology, and in many recent special papers upon plant adaptations.

Quite inexcusable, further, is Mr. Bather's statement that Robert Smith, in his justly praised paper on the 'Study of Plant Associations' (in *Natural Science* for February, 1899) does not mention the word *ecology*. Smith uses it no less than four times in that paper. Thus on page 113, Smith says, "Reiter (1885) modified Grisebach's scheme of plant forms to reconcile it with later research in plant *ecology*." Again on page 112, Smith says, "In the bibliography at the end of this paper a few only of the chief of these have been mentioned as representative *ecological* works, dealing with such marked forms of vegetation as strand plants, aquatic plants, halophytes, desert plants, etc." And he uses *ecological* again in the footnote at bottom of page 115, and again, on page 110. Mr. Bather's implication that Smith did not use the word *ecology* in connection with plant

associations is therefore without foundation. In fact Smith used the word precisely as other botanists are using it to-day.

Mr. Bather calls the form *ecology* a 'vagary of incorrect spelling' of *œcology*. The shorter spelling was formally recommended in 1893 by the foremost botanical organization in this country, on the general ground that the same considerations which make *economy* preferable to *œconomy* make *ecology* preferable to *œcology*. The recommendation has been followed by practically all writers on botanical subjects in this country and occurs in nearly all of the botanical works of the highest educational and scientific standing in America, (Campbell's recent text-book is the only exception I have noticed), and in most if not all papers now appearing based on original work upon adaptations. Whether under these circumstances the form *ecology* can be properly described as a vagary of incorrect spelling I leave the reader to judge.

W. F. GANONG.

TO THE EDITOR OF SCIENCE: In spite of the number of letters written with regard to the word *ecology*, the fact has been overlooked that the Standard Dictionary gives *ecology*, so spelled, with a cross reference to *œcology*, and so it is a great mistake to say that the newest spelling is not in the latest dictionary. It seems only just to the Standard Dictionary that this statement should be made.

WALLACE CRAIG.

HULL ZOOLOGICAL LABORATORY.

IN view of the recent discussion as to the tardy recognition of scientific terms by the dictionaries, it may be interesting to note that the word *tropism* which is now so commonly used in the discussion of the origins of motor reactions in organisms does not appear in any of the dictionaries (including the 'Century') that are accessible to me. Neither this term nor the term *ecology* belong to the class of narrow technical terms but would demand general definition on account of their comprehensive connotation. I am not aware of the origin or the exact degree of recentness of the term *tropism*; but my impression is that it has been used sufficiently long

to have secured some recognition. Still it must be remembered that the word *appendicitis* was not current enough when the first volume of the 'Century Dictionary' appeared, to warrant its inclusion.

JOSEPH JASTROW.

#### INDIAN SUMMER.

TO THE EDITOR OF SCIENCE: I wish to call the attention of your readers to the exhaustive articles on the origin of the term Indian summer, which is published in the *Monthly Weather Review* for January and February of this year. Mr. Albert Matthews (145 Beacon Street, Boston, Mass.), the author of this memoir, has spared no labor in collecting the early examples of the use of this term. Its first recorded appearance is in the year 1794 in the journal of Major Ebenezer Denny for October 13, 1794, while at Le Boeuf, a few miles from the present city of Erie, Pa., and there can be no doubt but what the term was in extensive use and well recognized at that time. Since that date numerous explanations have been given by different persons as to the origin and original meaning of the term, but these are of the nature of myths or hypotheses and it is very much to be hoped that we shall yet discover earlier cases and the true history of its introduction. We shall be very glad to hear from any one who can add anything of value to the elaborate paper by Mr. Matthews.

CLEVELAND ABBE.

WEATHER BUREAU,

U. S. DEPARTMENT OF AGRICULTURE.

#### BOTANICAL NOTES.

##### NATURE STUDY.

WE have had all sorts of books on 'Nature Study,' and for the most part they have been an abomination with nothing to redeem them, possibly with the exception that the authors 'meant well.' Enthusiastic persons who knew nothing exactly about nature, and still less about children, wrote impossible lessons for the pupils in the schools, and too often the superintendents knowing no more in regard to either, 'adopted' these misbegotten productions, and issued instructions to teachers to dole out so many pages a week to the defense-